FRACTURE-PROOF FLAT CLASPING FLOORBOARD STRIP AND THE FLOORING ASSEMBLED WITH SUCH STRIPS

TECHNICAL FIELD

This invention relates to a type of floorboard strips and the corresponding flooring, especially fracture-proof flat clasping floorboard strips and the flooring assembled with such strips.

BACKGROUND

Existing wood flooring types include solid wood flooring, solid wood composite flooring, reinforced composite flooring, and bamboo and wood composite flooring, etc. Wood flooring has become one of the first choices by consumers because of its natural and elegant designs, easy maintenance and competitive prices. In the end of 1970s, the slot mortise direct locking flooring came into existence, which eliminated previous complicated installation and leveling procedures. However, this kind of flooring has the following defects: firstly, floor expands and shrinks due to the humidity change, which causes cracks at the board joints; secondly, adhesives must be applied to the board joints during installation, which increases installation costs and causes air pollution; thirdly, as the upper and lower surface sides of both slot mortise and tenon generally level with each other, the tenon tends to break at its root when the floor is not level enough and either side of the joint is under stress. As shown in Figure 1, another type of flooring in use today is the rotation fitted clasping flooring invented by Unilin Décor – a company in Belgium – in the 1990s and patented as European patent EP1024234 and US Patent 5,516,579 in 2005. This type of flooring has the following defects: firstly, its installation is not as easy as the flat clasping type. During the installation, the tenon (100) of a flooring strip must be inserted obliquely into the slot mortise (200) of another strip and then the former strip is rotated to a certain degree to lock the tenon (100) in the slot mortise (200). This oblique insertion installation is complicated and can easily cause damages to tenons and slot mortises. Secondly, during installation the upper side of a tenon must be strictly aligned to that of the slot mortise. Otherwise the installation would be impossible. Due to the strict

requirements on installation only professional workers can complete the installation. Thirdly, as the flooring is designed in clasping structure, damages may easily happen to the clasping structure at the short sides during their installation to adversely affect the quality of the installed flooring.

INVENTION CONTENT

Objective of the invention: Existing flooring techniques have the following defects - air humidity change will cause the floor to expand and shrink leading to cracks at the board joints; adhesives must be applied to the board joints during installation and the use of adhesives will increase installation costs and cause air pollution; in US Patent 5,516,579, as the upper and lower surface sides of both slot mortise and tenon generally level with each other, the tenon tends to break at its root when the floor is not level enough and either side of the joint is under stress. The objective of this invention is to provide a type of fracture-proof flat clasping floorboard strips and the flooring assembled with such strips.

In order to achieve the above objective, this invention provides a type of fracture-proof flat clasping floorboard piece. The floorboard piece has an elongated strip shape. A slot mortise is formed along one of the long sides of the floorboard piece, while a tenon is provided along the other long side. The short sides of the floor board piece are also provided with a slot mortise and a tenon. The upper and lower side walls of the slot mortise are respectively short and long ends. The upper surface of the slot mortise is parallel to and has the same height with the upper surface of the tenon. In the lower surface of the slot mortise there is a V-shaped groove while a corresponding convexity is provided on the lower surface of the tenon. The convexity, in the insertion direction of the tenon, has an anti-self-locking oblique surface formed on its front end. The oblique surface forms a first angle with the upper surface of the floorboard strip. The first angle varies between 15-35°. A corresponding oblique surface is formed on the external surface on the long end (lower side wall) of the slot mortise to engage with the anti-self-locking oblique surface. The rear end of the convexity fits perfectly with the external side surface of the V-shaped groove to form a self-locking surface, which

forms a second angle with the upper surface of the strip. The second angle varies between 30-70°. The external shape of the tenon corresponds with the shape of the slot mortise.

Normally, the side wall of the long end of the slot mortise is 2-4mm longer than that of its short end.

In order to achieve the above objective, this invention also provides a flooring assembled with the above-mentioned fracture-proof flat clasping floorboard strips. Such flooring comprises a plurality of strips assembled together with the tenon on one strip inserted into the slot mortise in another strip to form the floor surface.

The advantages of such flooring include: the floorboard strips have aesthetic appearance and structure and are easy to manufacture and assemble, to effectively prevent damages to the flooring during installation; because no adhesive is needed to join the strips during installation, the assembled flooring is safe and environment-friendly and has a long service life.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows structure of flooring A;

Figure 2 shows cross-sectional view of floorboard strips;

Figure 3 shows structure of the assembled flooring;

Figure 4 shows assembling of the floorboard strips.

In the figures: 1. strip body, 11. slot mortise, 12. tenon, 100. tenon of conventional flooring strips, 111. short end of the slot mortise, 112. long end of the slot mortise, 113. upper surface of the slot mortise, 114. lower surface of the slot mortise, 115. V-shaped groove, 116. oblique plane, 117. oblique plane on the external surface of V-shaped groove, 121. upper surface of the tenon, 122. lower surface of the tenon, 123. convexity in the lower surface of the tenon, 124. anti-self-locking oblique plane, 125. rear oblique surface of the convexity in the

lower surface of the tenon, 200. slot mortise of conventional flooring strips, 300. cushioning block, 400. rubber hammer, α. first angle, β. second angle, P. upper surface of the strip

EMBODIMENTS

Figures 2-4 shows the technical details of this invention without any limitations. Detailed description of embodiments of the techniques of this invention will now be described in connection with Figures 2-4.

Figure 2 shows a cross-sectional view of a floorboard piece according to the invention. As shown in Figure 2, the invention provides a fracture-proof flat clasping floorboard piece B, which is an elongated strip body 1; the strip body 1 have a slot mortise 11 provided along one of the long sides of strip body 1 and a tenon 12 formed along the other long side, the slot mortise 11 have upper and lower side walls, which are respectively short end 111 and long end 112; the upper surface 113 of the slot mortise is parallel to and has the same height as the upper surface 121 of the tenon; in the lower surface 114 of the slot mortise 11 there is a V-shaped groove 115; a convexity 123 is correspondingly provided on the lower surface 122 of the tenon; along the insertion direction of tenon 12, an anti-self-locking oblique surface 124 is arranged on the front end of the convexity 123; the oblique surface forms a first angle α with the upper surface P of the floorboard strip; normally, the first angle α can range from 15-35°; a corresponding oblique surface 116 is formed on the external surface of the long end 112 of the slot mortise to match the angle of the anti-self-locking oblique plane 124. The rear surface 125 of the convexity in the tenon matches perfectly with the external oblique surface 117 of the V-shaped groove in the slot mortise to form a self-locking oblique surface. The self-locking oblique surfaces 125 and 117 form a second angle β with the upper surface P of the floorboard strip; normally, the second angle β can range from 30-70°. The external shape of the tenon 12 corresponds with the shape of the slot mortise 11 in order to enhance the stability of the assembled flooring. For the purpose of easy installation, the long end 112 of the slot mortise is usually 2-4mm longer than the short end 111.

At the same time, slot mortise and tenon are also formed on the short sides of strip B. The shapes and structures of the slot mortire and tenon formed at the short sides are the same as those formed along the long sides.

Figure 3 shows the structure of an assembled flooring. As shown in Figure 3, this invention also provides a fracture-proof flat clasping flooring assembled with the above-mentioned flooring strips B. The flooring includes a plurality of floorboard strips B, in which the tenon 12 on one strip is inserted into the slot mortise 11 in another floorboard strip to form the floor surface.

Figure 4 shows assembling of the floorboard strips. As shown in Figure 4, cushion block 300 and rubber hammer 400 are used in the installation process in order to prevent damages from happening to floorboard strips B to affect the quality of the assembled flooring. First, fix one floorboard strip B, then insert the tenon 12 of another floorboard strip B' into the slot mortise 11 of the already fixed strip B. Cushion block 300 is supported by the brim of the unfixed strip B'. The portion of the cushion block 300 that bears against the floorboard strip B also has its long end and short end, which respectively bear against the short end and the long end of strip B' to facilitate the installation. As is also shown in Figure 2, because the lower surface 122 of the tenon is an oblique surface, when tenon 12 just enters slot mortise 11, the lower surface 122 of the tenon passes the oblique surface 116 on the external surface of the long end 112 of the slot mortise 11, the anti-self-locking oblique surface 124 of the convexity 123 on the lower surface of the tenon comes close to the oblique surface 116, and the upper surface 121 of the tenon passes the upper surface 113 of the slot mortise for 1-2 mm. At this time, use rubber hammer 400 to strike the outside of cushion block 300 to force the convexity 123 on the lower surface of the tenon to be inserted into the V-shaped groove 115 in the slot mortise, and to form close contact between the self-locking oblique surfaces, through a complete match of the rear end oblique surface 125 of the convexity 123 on the lower surface of the tenon with the external oblique surface 117 of the V-shaped groove in the slot mortise, thereby interlocking the two strips. Similarly, a plurality of floorboard strips can be assembled and finally form the flooring.

Because same tenons and slot mortises are formed on both long and short sides of strip B, floorboard strips can be assembled in many ways. Strips can be joined along their long sides or along their short sides; the tenons and the slot mortises on the long and short sides can be assembled with one another to form different flooring patterns.

The floorboard strips provided in this invention have simple structure and are easy to manufacture. The method of flat clasping is employed in the assembly process and the use of cushion blocks can effectively prevent damages to the floorboard strips during installation. The arrangement of anti-self-locking and self-locking oblique surfaces provides a stable structure to the assembled flooring. Because no adhesive is needed to connect the strips during installation, the flooring is safe and environment-friendly. The installed flooring looks good and has a long service life and has overcome many defects of conventional flooring.